

World Heritage Sites

Protected
Areas and
World
Heritage



JIUZHAIGOU VALLEY SCENIC & HISTORIC INTEREST AREA CHINA

The Jiuzhaigou valley extends over 72,000 hectares of northern Sichuan. The surrounding peaks rise more than 2,400m to 4,560m clothed in a series of forest ecosystems stratified by elevation. Its superb landscapes are particularly interesting for their series of narrow conic karst land forms and spectacular waterfalls and lakes. Some 140 bird species are found in the valley, as well as a number of endangered plant and animal species, including the giant panda and the Sichuan takin. There are Tibetan villages in the buffer zone.

COUNTRY

China

NAME

Jiuzhaigou Valley Scenic and Historic Interest Area

NATURAL WORLD HERITAGE SITE

1992: Inscribed on the World Heritage List under Natural Criterion vii.

STATEMENT OF OUTSTANDING UNIVERSAL VALUE [pending]

INTERNATIONAL DESIGNATION

1997: Jiuzhaigou Valley recognised as a Biosphere Reserve in the UNESCO Man and Biosphere Programme (106,090 ha).

IUCN MANAGEMENT CATEGORY

III Natural Monument

BIOGEOGRAPHICAL PROVINCE

Sichuan Highlands (2.39.12)

GEOGRAPHICAL LOCATION

In northern Sichuan Province, west-central China, in the southern Min Shan Mountains some 270 km north of Chengdu. It includes the catchments of three streams which join the Zharu river to form the Jiuzhaigou river. Located between 32° 54' to 33° 19'N and 103° 46' to 104° 04'E.

DATES AND HISTORY OF ESTABLISHMENT

1978: Part of the area protected as a Nature Reserve. It had been almost unknown and undisturbed before 1975-79 when it was heavily logged, prompting state concern to protect the site;

1982: The site proposed as an area of Scenic Beauty and Historic Interest by the State Council of the People's Republic of China;

1984: An Administration Bureau for the site was established;

1987: An overall plan for the site with regulations drafted and approved.

1997: Designated a UNESCO Biosphere Reserve.

LAND TENURE

State, in Nanping County within the jurisdiction of the Aba Tibetan and Qiang Autonomous Region. Managed by the Administrative Bureau of Jiuzhaigou Valley Scenic and Historic Interest Area (ABJ)

for the Sichuan Provincial Commission for Construction. The forests are managed by the State Forestry Administration.

AREA

72,000 ha, with a buffer zone of 60,000 ha. The area of Jiuzhaigou Nature Reserve is given as 60,000ha in MoF/WWF (1989). The site is near Huanglong Scenic Area (70,000 ha) to the south and Wanglang Nature Reserve southeast (27,700 ha).

ALTITUDE

2,140m at Luveihai, (Reed Lake) at the mouth of Jiuzhaigou to 4,558m (Mt. Ganzigonggai).

PHYSICAL FEATURES

Jiuzhaigou valley is a district of narrow forested valleys and lakes beneath steep snow-capped mountains on the rugged margins of the Tibetan plateau. The site is dominated by three drainages, the Rize and Zechawa streams which flow from south to north, sometimes underground, meeting at the centre of the site to form the Shuzheng, which drops 1,000m to the north end of the Reserve. There it meets the Zharu stream flowing north-west from the eastern boundary to form the Jiuzhaigou river, one of the sources of the Jialing river, part of the Yangtze River system. Most of the boundaries follow the high mountain ridgelines defining the watersheds of these rivers. In 1991 the MoC listed 108 lakes, 47 springs, 17 groups of waterfalls, 11 rapids and 5 tufa shoals within the Reserve. The valley bottoms are flat and their sides steep.

Jiuzhaigou lies on the edge between the Qinghai-Tibetan and Yangtze tectonic plates. Major fault lines run through the site, the west half of which is rising. Earthquakes are not uncommon and have been a major influence on the landscape. The rock strata are dominated by intensely folded carbonate rocks, notably dolomite and tufa, with some exposed sandstone and shale. Of geologic interest are the high altitude karst landforms which have been strongly carved by glacial, hydrologic and tectonic activity resulting in U-shaped valleys, cirques and hanging valleys. Most of the site soils are derived from this limestone rock, are well developed and are neutral to slightly alkaline with some variation in colour and texture. The higher mountain meadow soils are poorly developed, the high mountain soils are skeletal or permanently frozen (MoC, 1991).

The best known feature of Jiuzhaigou is its very numerous lakes, many brilliantly coloured due to the calcium deposits in the water. Many of these are classic ribbon lakes in glacially formed valleys, dammed by avalanche rock-falls and stabilised and terraced by carbonate deposition. Above and/or below some of the lakes are calcareous tufa dykes and shoals. In two places, there are terraced lakes separated by tufa weirs like the travertine pools of Huanglong Scenic Area to the south; these sites, Shuzheng Lakes and Nuorilang Lakes, with 19 and 18 lakes respectively, are less well-developed geologically than the pools in the Huanglong Scenic Area nearby, but are much larger in size. There is a number of large and spectacular waterfalls, including Xionguashai (Panda Lake) Fall which drops 78m in three steps, and the Zhengzhutan (Pearl Shoal) Fall, which drops 28m in a 310m-wide curtain of water, both in the Rize valley. Pearl Shoal Fall lies at the downstream end of the Zhengshutan which is the largest of the tufa shoals in the Reserve. These shoals are wide gently sloping areas of active calcareous deposition under thin sheets of flowing water. Although spectacular, they are not as extensive as those in the Huanglong Scenic Area

CLIMATE

The area has a subtropical to temperate monsoon climate, with a succession of zones cooling with altitude. Valleys are warm and dry, the middle mountain slopes cold and damp. At Nuorilang at 2,400m in the Shuzheng valley the mean annual temperature is 7.8°C, the mean January temperature is -3.7°C and the mean July temperature is 16.8°C. The total annual rainfall there is 761mm but in the cloud forest between 2,700m and 3,500m it is at least 1,000mm. 80% of this falls between May and October as the monsoon moves up the valley giving mild, cloudy, moderately humid summers. Above 3,500m the climate is colder and drier. Snow falls between October and April (Winkler, 1998). Monthly precipitation totals are: January 15mm, February 24mm, March 36mm, April 43mm, May 87mm, June 96mm, July 104mm, August 82mm, September 86mm, October 54mm, November 26mm and December 18mm (A. Phillips, *in litt.*, 1996).

VEGETATION

Jiuzhaigou lies close to the intersection of the Eastern Asian, Himalayan, and subtropical Palaeartic floristic regions, between the eastern and southeastern damp forests, the coniferous mountain woods

and the grass and shrubland of the Qingzang Plateau. Past glaciation never reached below 2,800m which has preserved a wide variety of relict and endemic species in what is the most biologically diverse temperate forest in the world. Virgin forests of mountain conifers and mixed broadleaf-coniferous species cover 63.5% of the site, with much of the rest being above the tree line. In 1986 more than 150 tree species were reported and in 1991 744 seed plants were counted (Winkler, 1998). MoC in 1991 stated that 2,576 plant species had been recorded for the area, including 212 aquatic species (which contribute to the colour of the lakes), and 512 categories of seed plant. Included in the MoC list are 92 species plus 42 varieties or subspecies of interest for their rarity, endemism, ornamental or medicinal value. The area is known for orchids. A baseline survey of the flora is being undertaken, looking especially at the subalpine levels.

The following observations are taken from Winkler (1998). There are three main belts of vegetation: montane mixed forest (2,000m to 2,700m), cloud forest (2,700m to 3,500m) and subalpine (3,500 to 4,200m). The vegetation of north- and south-facing slopes is strongly differentiated. From 2,000m to 2,400m, the loess soils of the dry valley bottoms used to be farmed and the slopes have suffered many fires. The original Chinese hemlock of the north slopes has been almost replaced by a secondary forest of pine and oak: Chinese red pine *Pinus tabulaeformis* with an oriental white oak *Quercus aliena* and *Q. baronii* understorey. Smoketree *Cotinus coggyria* is dominant on south-facing slopes, and *Rhododendron micranthum* on cool slopes. Between 2,400m and 2,700m the conditions are more humid with a richer soil, though tree-cutting and fires have also damaged this zone. North-facing slopes are dominated by a fir-spruce forest of *Abies faxoniana* with *Picea wilsoni* and dragon spruce *P. asperata*, south-facing slopes by a pine-spruce forest of *Pinus tabulaeformis* with Chinese white pine *P. armandii* and *Picea asperata*. The pioneer and sub-canopy species is Chinese paper birch *Betula albo-sinensis* with a low tree layer of maple *Acer* and linden *Tilia* species. The rare plum yew *Cephalotaxus fortunei* occurs here.

The altomontane cloud-forest between 2,700m and 3,500m has a high rainfall and constant high humidity. It occurs in two layers: bamboo forest to 3,200m (15% of the Reserve), and rhododendron-dominated north slopes to 3,500m. This cloud forest is the habitat of the giant panda where the fountain bamboo *Fargesia-Sinarundinaria nitida*, its most important food, dominates the understorey (Winkler, 1998). This level was logged in the late 1970s. The dominant conifers are *Abies faxoniana*, *Picea asperata*, *P. wilsoni* and purple-coned spruce *P. purpurea* (which is also being planted) with a sub-canopy of *Betula albo-sinensis* and Himalayan birch *B. utilis*, low *Acer* spp. and fountain bamboo which suffered a major die-off after flowering in the 1970s and early 1980s, *Fargesia denudata* and *F. chinensis*. Branches are sleeved in mosses and lichens such as beard lichen *Usnea longissima*. Minjiang cyprus *Cupressus chengiana*, *Eucommia ulmoides*, *Picea brachtyla* (VU), *Larix mastersiana* (VU), *Tetracentron sinensis*, katsura tree *Cercidiphyllum japonicum* and the rare endemic relict one-leaved grass *Kingdonia uniflora* also occur here. Around 3,200m sub-tropical vegetation gives way to temperate species but humidity and epiphyte growth remain high. Here cool slopes have *Abies faxoniana* with *Betula utilis* and a shrub layer totally dominated by *Rhododendron* species: between 2,700m and 3,800m there are 15 species of rhododendron (MoC, 1991). A larger herbaceous cover is dominated by sedges *Carex* spp. and *Kobresia macrantha*. Warm slopes have *Picea purpurea* and junipers *Sabina convallium* and *S. saltuaria* with some larch *Larix potaninii*.

The subalpine belt between 3,500m and 3,900m is drier, with, on north slopes, *Abies faxoniana* and *Betula utilis* above rhododendrons which grow up to the tree line, becoming dwarfed, and on south slopes, junipers with some *Picea purpurea* and larch as the forest gives way to mountain shrubs (*Salix* spp. and sedges) mixed with alpine meadows used as yak pastures. Meadows dominate above 3,800m and form the only vegetation above 4,000m along with high-alpine species such as *Saussurea medusa*. (Winkler, 1998). Above about 4,200m is permanent snow and ice.

FAUNA

The varied habitats and wide altitudinal range of the site make for a highly diverse and biologically important fauna. MoC (1991) notes 170 vertebrate species and lists ten mammals and two fish, including notable species as giant panda *Ailuropoda melanoleuca* (EN), red panda *Ailurus fulgens* (VU), golden snub-nosed monkey *Rhinopithecus roxellana* (EN), rhesus monkey *Macaca mulatta*, Szechwan takin *Budorcas taxicolor thibetana* (VU) serow *Capricornis sumatraensis* (VU), Chinese goral *Naemorhedus griseus*, tufted deer *Elaphodus cephalophus*, forest musk deer *Moschus berezovskii* (EN) and white-lipped deer *Przewalskium albirostris* (VU). Ji *et al.* (1990) state that Chinese water deer *Hydropotes inermis* (VU) is also present. Winkler (1998) adds Himalayan black

bear *Ursus thibetanus* (VU), clouded leopard *Neofelis nebulosa* (VU) and bamboo rat *Rhizomys sinense*.

In 1996 the panda population was estimated at 17 individuals (A. Phillips, *in litt.*, 1996) but was formerly larger and linked to other populations to the east and northeast of the reserve. MoF/WWF in 1989 described the population as being small and totally isolated. The proximity of the site to other panda populations, notably in Baihe and Wanglang Reserves and the proposed Wujiao Reserve, gives potential for restoring the links between these populations and maintaining a healthy gene flow. A large interconnected series of reserves would be valuable to the continued survival of the golden snub-nosed monkey (EN) too, which also requires extensive areas of undisturbed habitat (MacKinnon, 1986).

The Park is in one of the world's Endemic Bird Areas and 141 species of birds have been recorded from the site. Some 13 of these are listed as endangered including lesser kestrel *Falco naumanni* (VU), Chinese grouse *Bonasa sewerzovi*, Chinese monal *Lophophorus lhuysii*, (VU), blue-eared pheasant *Crossoptilon auritum*, Sichuan wood owl *Strix uralensis* (VU), Sichuan treecreeper *Certhia tianquanensis*, rusty-throated parrotbill *Paradoxornis przewalskii* (VU), snowy-cheeked laughing thrush *Garrulax sukatschewi* (VU), rufus-headed robin *Luscinia ruficeps* (VU), blackthroated blue robin *L. obscura* (VU), and a subspecies of boreal owl *Aegolius funereus beickianus* which is endemic to the region. Many of these are found in the biodiverse panda habitat, threatened by logging in the past and by tourist disturbance today (MoC, 1991; Fishpool & Evans, 2001).

CONSERVATION VALUE

The geomorphology resulting from glacial and tectonic activity is of interest and the valleys with their forested snow-capped mountains, karst landforms, numerous richly colored lakes, waterfalls, tufa shoals and the autumn display of leaves are aesthetically remarkable. The site supports a highly diverse flora and fauna, including a number of threatened species, and the Tibetan villages in the buffer zone add to its cultural interest. The Park lies within a Conservation International-designated Conservation Hotspot, a WWF Global 200 Freshwater Eco-region, a WWF/IUCN Centre of Plant Diversity and is in one of the world's Endemic Bird Areas. It also forms part of a UNESCO Biosphere Reserve.

CULTURAL HERITAGE

In local legend the origin of the 114 lakes is the shattering of a mirror given by a mountain god of the valley to a mountain goddess who dropped it. A tufa dyke clearly visible below the surface of Dragon lake (Wolonghai) is compared to a dragon, and other lakes are held to contain mythical monsters. These stories are an attraction to tourists and have received some critical interest (CAS, 1987). The local Tibetan people practice the pre-Buddhist Bön religion (Winkler, 1998). Stupas (shrines) and prayer-wheels are seen everywhere, evidence of the local belief that soul is inherent in all things, including mountains. However it is reported that the maintenance of local Tibetan cultural traditions is a major problem today except in the artificial and modified form of tourist exhibitions (ABJ, 2003).

LOCAL HUMAN POPULATION

Until 1975 this remote and inaccessible area was little known. It was then heavily exploited by the logging industry until 1979. Jiuzhaigou means literally nine-stockade-valley because there were once nine Tibetan villages along its length; six remain. The total population is about 1,007, comprised of 112 families (ABJ, 2003). The government banned agriculture, replacing a traditional cultural landscape with a tourist-service culture (O'Donnell, 2004). Almost all of the remaining Tibetan villagers therefore now cater to tourists as hotel-keepers, guides, craftsmen and entertainers. This brings a relatively higher income to many people, but 20% still live below the poverty line. A small Buddhist monastery is located in the Zharu Valley. The town of Jiuzhaigou lies outside the site on the northwestern border and there is constant growth of commercial activity just outside the entrance to the Reserve.

VISITORS AND VISITOR FACILITIES

The Reserve has been open to tourists since January 1984 and access from Chengdu has become less difficult. Since then, the annual numbers of tourist numbers, including those from overseas, have increased from 5,000 in 1984 through 160,000 in 1995, 3,000 of whom were foreigners to 1,190,000 in 2002. Their numbers were capped at 12,000 per day in 2001, because of pressures due to the popularity of the site. Restaurants and tourist accommodation are no longer available within the site, but have been strongly developed just outside it. 25,000 beds were already provided by 2001 in over

20 hotels and Tibetan style accommodations just outside the site, and a restaurant seating 3-4,000. 55.5 km of paved roads and 47 km of boardwalks have been built in the valleys, plus a visitors' centre at the entrance, several small viewing pavilions, 17 rest houses and new toilets. Horse and yak riding are also locally available. Travel within the site is restricted to walking or shuttlebus (also used for the school run), and since 1999 227 low-polluting buses accompanied by local guides have been used to ferry around the increasing number of large groups (ABJ, 2003). A new airport has been built nearby at Chuanzhu to serve tourists to Jiuzhaigou and Huanglong Scenic Areas.

SCIENTIFIC RESEARCH AND FACILITIES

A Terrestrial Ecosystems Monitoring Site has been established in the valley and there are stations for monitoring forest pests and diseases and for meteorological observation (ABJ, 2003). A scientific department manages research within the site, cooperation with other scientific institutes and universities and has drawn up a strategy for research into the challenges brought by rapid change. Nearly 100 papers have been published on the geology, geomorphology, hydrology, meteorology, biology, botany and environmental protection of Jiuzhaigou, including studies on the giant panda in the region (MoF/WWF, 1989; MoC, 1991).

MANAGEMENT

The Sichuan Provincial Commission for Construction has overall responsibility for the protection and administration of the site. The Administrative Bureau of Jiuzhaigou (ABJ), which is subdivided into a number of departments including a Protection Section, Scientific Section, Construction Section and a police substation provides on-the-ground administration. In addition to national legislation, there is a number of relevant local government decrees and regulations. The management plan, last revised in 2001, is based on these laws and contains specific regulations and proposals: tree-cutting and logging with forest clearance and activities causing pollution are prohibited, and the needs of the local Tibetan population are to be taken into full consideration (ABJ, 2003).

It is the policy of the state to accelerate the development of the western region. This formerly meant maximising extraction of timber, which supported most of the local administrations until first a lack of irrigation water downstream and then disastrous flooding led to a ban on commercial logging in 1998 and a turn towards sustainable forestry. State policy now emphasises increasing the returns from tourism. A management goal set in 1992 has been to progressively transfer local residents from employment in agriculture to scenic area protection. This resettlement of the Tibetan villagers out of the Reserve was controversial because they and their ancient culture and landscape were considered to be one of the attractions of the site. It is justified both to protect habitat for pandas but also by the prosperity which the new conditions have brought to the previously resistant inhabitants.

Beginning in 1996, a five year plan was implemented to reduce the amount of agricultural land in the buffer zone. Tree-planting on all slopes steeper than 8% was mandated; one particular objective was to regenerate the forest in the heavily logged Zezhawa valley (Thorsell & Lucas, *in litt.*, 1992). The farmland within the site has now become forest or grassland, the former residents receiving some compensation. Fire prevention and anti-pollution measures are included in the site management plan, and an overall plan for site construction and land stabilisation has been drawn up by Chengdu Institute of Geography to protect the landscape. Most of 31 mud and rock flows and landslides examined in 1984 have already been brought under effective control, some with concrete protection.

An IUCN/WHC mission in 1998 found that the material and social conditions of the villagers had considerably improved under the partnership between local people and the Reserve management, and economic benefits from tourism had eliminated the need for exploiting the natural resources physically (UNESCO, 2003). From 2001, all the hotels within the site were closed or moved outside the borders and no accommodation was allowed within it. A comprehensive visitor management plan has developed, emphasising the need for adequate planning, environmental impact assessment, regulations, visitor education and staff training. An airfield and heliport have been built in Songpan County at Chuanzhu. A cooperation agreement with Cradle Mountain National Park in Tasmania was signed in 2001 to help the management share information and exchange experience (ABJ, 2003).

MANAGEMENT CONSTRAINTS

For some years lack of an effective tourism management policy and regulations, or of coordination between park management and local development plans aggravated the increasing overuse of the site, as did a threefold overestimation of the site's carrying capacity by local administrators. There has also been a lack of staff and guides qualified to deal with tourism, and insufficient allocation of the

revenue from entry fees. Noise, pollution and overcrowding of roads by shuttlebuses have also been a problem (Wei, 2004). As the numbers of tourists has increased, the threats of forest fires, pollution, soil erosion, mudflows, intrusive facilities and the disturbance of rare species increase. The guided bus tours, though controlled, are essentially mass tourism. The construction of large new hotels just outside the buffer zone, has brought additional income to the displaced Tibetan communities, but they are visually intrusive. The management plan includes provisions to deal with most of these problems but as visitor numbers grow, especially as road access from Chengdu is improved, and as the airport is within an hour's drive from the site, it has become important to set up a monitoring system for stricter control of pollution by solid wastes, sewage and construction. The pressure of high season over-visitation obliged the reserve's authorities in 2001 to limit visitor numbers to 12,000 per day, and entrance fees were increased (ABJ, 2003).

For some of the mammal species, notably giant panda and golden snub-nosed monkey, the site is not extensive enough without being connected to other reserves in the region, especially given the human population in the area and the increasing numbers of tourists. The MoF/WWF panda management plan of 1989 noted that the panda population formerly linked up along the valleys of Shabagou and Zarugou north-east of the reserve and with the other populations in Nanping and Pingwu counties. This connection had been cut by local people clearing the forest, while the panda population within the site had fallen due to heavy logging, continued human impact and the flowering and death of the *Fargesia nitida* bamboo in the 1970s. The report called for the resettlement of villagers outside the site and strict protection of the Jiuzhaigou-Baihe-Wujiao 'panda corridor', forbidding all logging, farming and human activities within it. This is considered essential to allow a free gene flow between otherwise isolated panda populations. In 1998 the IUCN/WHC mission team urged the Chinese authorities to implement the Committee's 1992 recommendation to link Huanglong and Jiuzhaigou World Heritage sites with some of the other reserves into a single Minshan Mountain World Heritage Area (UNESCO, 2003).

STAFF

The reserve has 379 full-time employees working in conservation, 30 of whom have university education. The whole site employs 468 permanent staff with up to 730 part-time employees (ABJ, 2003; Wei, 2004).

BUDGET

Funding comes from entrance fees 70% of which goes to the county. The annual budget is approximately RMB 6 million (US\$727,000) (ABJ, 2003). By 2001 cumulated funding of RMB26.3million (US\$3.2M) had been spent on research into forest diseases, pests and monitoring stations. (ABJ, 2003).

LOCAL ADDRESS

The Director, Administrative Committee of Jiuzhaigou Valley Scenic and Historic Interest Area, Jiuzhaigou Town, Jiuzhaigou County, Sichuan Province, China.

REFERENCES

The principal sources for the above information was the original nomination for World Heritage status and the Administrative Bureau of Jiuzhaigou Valley Scenic and Historic Interest Area (ABJ).

Anon. (1990). *Dreams of Jiuzhaigou*. Sichuan People's Publishing House, Chengdu, China. 126 pp.

Dingwall, P. (1997). Jiuzhaigou Nature Reserve. *Mountain Protected Areas Update*, March, 1997.

Fishpool, L. & Evans, M. (eds) (2001). *Important Bird Areas in Africa and Associated Islands*. Pisces Publications / Birdlife International, Newbury & Cambridge, U.K. BLI Conservation Series No.11.

IUCN (2004). *2004 IUCN Red List of Threatened Species*. IUCN, Gland, Switzerland / Cambridge, UK.

Ji, Z., Guangmei, Z., Huadong, W. & Jialin, X. (1990). *The Natural History of China*. William Collins & Sons. Ltd., London, UK. 224 pp.

MacKinnon, K. (1986). *Survey to Determine the Status and Conservation Needs of the Snub-nosed Monkey in Sichuan Province, China*. Unpubl. WWF Project Report. 23 pp.

Ministry of Construction (MoC) (1991). *World Heritage Convention, Natural Heritage: China. Jiuzhaigou Valley*. Proposal for World Heritage Nomination. Beijing, China. 92 pp.

Ministry of Forestry (MoF) (1989). *The Habitats of Giant Panda, Wolong, Tangjiahe, Wanglang Nature Reserves*. Ministry of Forestry. Unpublished report. 24 pp.

MoF/WWF (1989). *National Conservation Management Plan for the Giant Panda and its Habitat, Sichuan, Gansu and Shaanxi Provinces, The People's Republic of China*. Joint Report of the Ministry of Forestry, Beijing, China and World Wide Fund for Nature, Gland, Switzerland. 157 pp.

O'Donnell, P. (2004). Learning from world heritage: lessons from international preservation & stewardship of cultural & ecological landscapes of global significance. 7th US/ICOMOS International Symposium. *George Wright Society Forum*, Vol.21, No.2,

UNESCO World Heritage Committee (1998). *Report on the 22nd Session of the Committee*. Kyoto.

Wei, S, (2004). *Managing World Heritage Sites in China from an Economic Perspective*. Masters Thesis, Brandenburg University, Cottbus, Germany.

Winkler, D. (1998). The forests of the eastern part of the Tibetan Plateau. A case study from Jiuzhaigou. In *Plant Research and Development 47/48, Focus: Forest Management and Sustainability*. Vol.47/48. Tübingen, F.R.G. Pp. 184-210.

World Conservation Monitoring Centre (WCMC) (1991). *Plants of China. An Important Food for Giant Pandas*. Status report, November. (Unpublished list). 110 pp.

DATE

March 1992. Updated 5-1996, 4-1997, 5-2003, 1-2005, May 2011.